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IV. *Astronomiæ Cometicæ Synopsis, Autore* Edmundo Halleio *apud Oxonienſes Geometriæ Profefſore Saviliano, & Reg. Soc. S.*

VEteres *Ægyptii & Chaldaei*, ſiqua fides *Diodoro Siculo*, longa obſervationum ſerie inſtructi, Cometarum *ἐπιτολῆς* prænuntiare valuerunt. Cum autem iſdem artibus etiam Terræ-motus ac tempeſtates prævidiſſe dicantur, extra dubium eſt *Aſtrologiæ* potius calculo fatidico, quam *Aſtronomicis* motuum Theoriis eorum de his rebus ſcientiam referendam eſſe. Ac vix alia à Græcis utriuſque populi victoribus reperta eſt apud eos doctrina; adeo ut eam, quam nunc eoſque proveximus *Aſtronomiam*, Græcis ipſis, præſertim magno *Hipparcho*, uti inventoribus, acceptam debeamus. Apud hos vero *Ariſtotelis* ſententia, qui Cometas nihil aliud eſſe voluit quam Vapores ſublunares vel etiam Meteora aerea, tantum effecit, ut hæc *Aſtronomiæ ſcientiæ* pars longe ſubtiliſſima, omnino neglecta manſerit, cum nemini operæ pretium viſum fuerit, vagas & incertas fluitantium in æthere vaporum ſemitas adnotare ſcriptiſque mandare; unde factum ut ab illis nihil certi de motu Cometarum ad nos tranſmiſſum reperiat.

Seneca autem Philoſophus, perpensis duorum inſignium ſui temporis Cometarum Phanomenis, non dubitavit iis loca inter corpora cœleſtia assignare, Sydera eſſe cum mundo duratura exiſtimans, quanquam Motus eorum legibus nondum compertis regi ſcieatur. Tandemque Vaticinio non irritò promittit aliquando futura ſecula, quibus hæc tam occulta *dies extraheret ac longioris ævi diligentia*:

tia : quibusque admirationi foret hæc *Veteres* nescire potuisse ; postquam *Demonstraverit aliquis Naturæ Interpres in quibus Cæli partibus Cometæ errent, quanti, qualesque sint.* Ab hac autem *Senecæ* sententia in diversas partes abiit pene omnis Astronomorum Cohors ; ac ipse *Seneca*, neque Phænomena Motus quibus opinionem hanc tueretur, neque tempora adscribere dignatus est, quæ posteris ad hæc definienda usui forent. Ac evolutis plurimis Cometarum Historiis, nihil omnino invenio quod huic negotio inservire possit, ante annum à *Christo* nato 1337. quo *Nicephorus Gregoras* Historicus & Astronomus *Constantinopolitanus* nobis Cometæ semitam inter fixas satis accurate descripsit : tempora autem nimis laxè consignavit, ita ut non nisi quod abhinc quadringentis pene Annis apparuerit, lubricus & incertus hic Cometa Catalogo quem damus inferi mereatur. Dein Cometa anni 1472 omnium velocissimus ac terris proximus *Regiomontanum* habuit observatorem. Hic magnitudine ac Comæ terribilis, unius diei spatio 40 gradus sub circulo Cœli maximo emensus est, ac omnium primus est de quo observata idonea ad nos pervenere. Quotquot autem Cometas considerarunt, usque ad tempora *Tychonis Brahe* magni illius Astronomiæ restauratoris, eos sublunares esse autumârunt, adeoque parvi penderunt, utpote pro Vaporibus habitos.

Anno autem 1577, (*Tychone* jam studio astrorum serio incumbente, comparatisque Machinis ingentibus pro dimetiendis cœli arcubus, majori cum cura & certitudine quam Veteribus sperare fas erat) Emerfit Cometa satis conspicuus, cui observando strenue sese accinxit *Tycho* : multisque & fidis experimentis deprehendit, nulli quæ sentiretur Parallaxi diurnæ obnoxium fuisse, adeoque non tantum non fuisse Vaporem aereum, sed & etiam multo superiorem extitisse Lunâ : immo nihil obstabat quin inter ipsos Planetas collocaretur ; frustra interim contra obstrepentibus Scholasticorum nonnullis

Tychonis vero eximiam in observando industriam excepit *Kepleri* sagacissimum & pene divinum ingenium. Hic *Tychonis* laboribus fretus Systema Mundi verum & Physicum adinvenit, ac scientiam Astronomicam in inmensum auxit; Monstrato sc. Planetas omnes in Planis per Solis centrum transeuntibus revolvi, Curvasque Ellipticas describere, ea lege, ut Area Sectorum Ellipticorum, ad centrum Solis in Ellipseos foco constituti, temporibus, quibus describantur arcus, semper proportionales sint. Invenit etiam Distantias Planetarum à Sole esse in sesquialtera ratione temporum periodicorum, sive Cubos distantiarum esse ut Quadrata Temporum. Tanto autem Artifici affulsere duo Cometæ, quorum alter maxime illustris. Ex horum observatis conclusit *Keplerus* non uno parallaxis annuæ indicio, Cometæ inter Orbes planetarum liberrime quaquaversum ferri, motu quidem non multum à rectilineo diverso, sed quem nondum definire licuit. Ac *Hevelius*, *Tychonis* æmulus, *Kepleri* vestigiis insistens, eandem Hypothesim Motus rectilinei amplexus est, ipse plurium Cometarum Observator perquam subtilis. Cœlo tamen Calculum suum non penitus consentire questus est, Viamque Cometicam versus Solem incurvari suboluit.

Tandem de summo Cœlo lapsus est prodigiosus ille Cometa Anni 1680. quasi Casu perpendiculari Solem petens, & exinde pari velocitate assurgens: Hic per quatuor Menses continuos visus, insigni ac peculiari Curvitate Orbitæ ad investigationem Motus Theoriæ præ cæteris idoneus erat: Instructis autem jampridem Regiis Observatoriis, *Parisiensi* & *Grenovicensi*, ac Astronomorum Clarissimorum curæ commissis, accidit ut hujus Cometæ Motus apparens, quantum forsan mortalibus fas est, accuratissime a *Cassino* & *Flamstedio* observaretur.

Non multo post, dum Geometrarum Princeps illustrissimus *Newtonus* operam dabat *Principiis Philosophiæ Mathematicis*; non solum inventa *Kepleri* in Systemate Planetario necessario locum habere demonstravit. verum etiam

Cometarum Phenomena omnia ex iisdem Principiis evidenter consequi. Id quod exemplo prædicti Cometæ anni 1680. abunde illustravit, modumque docuit Geometrice construendi Orbitas Cometarum; Problemaque arduum ac tanto Oedipo dignum summa cum omnium admiratione resolvit. Cometam autem hunc in orbe parabolico Solem circumiisse probat, ita ut Areæ ad Centrum Solis æstimatæ Temporibus proportionales fuerint.

Tanti viri vestigia insecutus eandem methodum calculo Arithmetico accommodare aggressus sum, nec irritò Conamine. Undique enim conquisitis Cometarum Observationibus, Tabellam hanc, immensè pene Calculi fructum, obtinui, exiguum quidem sed non ingratum Astronomis munus. Hi etenim numeri vim habent omnia quæ de motu Cometarum hætenus observata sunt accuratissime representandi, ope solius Tabulæ Generalis insequentis, cui adornandæ nullis sane peperci laboribus, ut perfectæ prodiret, utpote Posteritati consecrata ac cum Scientia Astronomica duratura.

(1886)

Cometarium Omnium haftenus rite Obſervatorum , Motuum in Orbe Parabolico Elementa Aſtronomica.

| Comete Anni. | Nodus Ascend. | Inclin. Orbitæ. | Perihelion in Orbe. | Perihelion in Elliptica | Latitudo Perihelii | Diſtantia Perihelii à Sole. | Log diſt. Perihelii à Sole. | Temp æquas. Perihelii Londoni. |
|-----------------|----------------------|--------------------|------------------------|----------------------------|-----------------------|-----------------------------------|-----------------------------------|--------------------------------------|
| | gr. ° ' " | gr. ° ' " | gr. ° ' " | gr. ° ' " | gr. ° ' " | | | die. h. |
| 1337 | II 24. 21. 032. 11. | 0 8. 7. 59. | 0 8. 12. 45. 15 | 22. 40. 30 B | 40666 | 9. 609236 | Jan. 2. 6. 25 | |
| 1472 | VI 11. 46. 20 5. 20. | 0 8. 15. 33. 30 | 0 8. 15. 40. 20 | 4. 25. 50 A | 54273 | 9. 734581 | Feb. 28. 22. 33 | |
| 1531 | VI 19. 25. 017. 56. | 0 33. 1. 39. | 0 33. 0. 48. 15 | 17. 3. 05 B | 36700 | 9. 753583 | Aug. 24. 21. 18 1/2 | |
| 1532 | II 20. 27. 032. 36. | 0 35. 21. 7. | 0 35. 16. 59. 40 | 15. 57. 00 B | 5091 | 9. 706823 | Oct. 19. 22. 12 | |
| 1556 | III 25. 42. 032. 6. | 0 34. 8. 50. | 0 34. 11. 6. 00 | 31. 10. 20 B | 46390 | 9. 666424 | Apr. 21. 20. 3 | |
| 1577 | VI 25. 52. 074. 32. | 0 45. 9. 22. | 0 45. 7. 53. 00 | 69. 35. 20 A | 18342 | 9. 262447 | Oct. 26. 18. 45 | |
| 1580 | VI 18. 57. 206. 4. | 0 35. 19. 5. | 0 35. 17. 10. 64 | 40. 0 B | 59228 | 9. 775450 | Nov. 28. 15. 00 | |
| 1585 | VI 7. 42. 30 6. 4. | 0 37. 8. 51. | 0 37. 8. 50. 10 | 2. 55. 25 A | 109358 | 9. 038850 | Sept. 27. 19. 20 | |
| 1590 | III 15. 30. 402. 40. | 0 40. 6. 54. | 0 40. 2. 55. 30 | 22. 45. 50 A | 51661 | 9. 700882 | Jan. 29. 3. 45 | |
| 1596 | III 12. 12. 305. 12. | 0 35. 12. 0 18. | 0 35. 22. 44. 35 | 54. 44. 30 B | 51293 | 9. 710058 | Julii 31. 19. 55 | |
| 1607 | VI 20. 21. 017. 2. | 0 33. 2. 16. | 0 33. 1. 29. 40 | 10. 5 B | 58080 | 9. 768450 | Oct. 16. 3. 50 | |
| 1618 | II 16. 1. 037. 34. | 0 37. 3. 14. | 0 37. 6. 10. 00 | 35. 50. 0 A | 37975 | 9. 579428 | Oct. 29. 12. 23 | |
| 1652 | II 28. 10. 079. 28. | 0 37. 28. 18. | 0 37. 10. 41. 35 | 30. 14. 0 A | 84750 | 9. 928130 | Nov. 2. 15. 40 | |
| 1661 | II 22. 30. 303. 35. | 0 35. 25. 58. | 0 35. 21. 37. 30 | 17. 17. 0 B | 44851 | 9. 651772 | Jan. 16. 23. 41 | |
| 1664 | II 21. 14. 021. 18. | 0 31. 10. 41. | 0 31. 8. 40. 35 | 10. 1. 50 A | 102575 1/2 | 9. 011044 | Nov. 24. 11. 52 | |
| 1665 | III 18. 02. 076. 05. | 0 31. 11. 54. | 0 31. 6. 35. 23. | 8. 0 B | 10649 | 9. 027309 | Apr. 14. 5. 15 1/2 | |
| 1672 | VI 27. 30. 308. 22. | 0 16. 59. 30 | 0 16. 26. 00. | 27. 40 B | 69739 | 9. 843476 | Feb. 20. 8. 37 | |
| 1677 | III 26. 40. 107. 03. | 0 15. 17. 37. | 0 15. 16. 21. 05 | 75. 44. 10 B | 28059 | 9. 448072 | Apr. 26. 00. 37 1/2 | |
| 1680 | VI 2. 2. 060. 56. | 0 45. 22. 39. | 0 45. 27. 26. 50 | 8. 11. 10 A | 00612 1/2 | 7. 787100 | Dec. 8. 00. 6 | |
| 1682 | VI 21. 16. 301. 17. | 0 56. 2. 52. | 0 56. 2. 30. 16. | 59. 20 B | 58328 | 9. 765877 | Sept. 4. 07. 39 | |
| 1683 | III 23. 23. 083. 11. | 0 31. 25. 29. | 0 31. 10. 36. 55 | 82. 52. 00 B | 50020 | 9. 748343 | Julii 3. 2. 50 | |
| 1684 | VI 28. 15. 065. 48. | 0 47. 15. 15. | 0 47. 15. 25. 26. | 35. 20 A | 96015 | 9. 682333 | May 29. 10. 16 | |
| 1686 | VI 20. 34. 403. 1. | 0 40. 17. 00. | 0 40. 16. 24. 00 | 31. 17. 35 B | 32500 | 9. 511883 | Sept. 6. 14. 33 | |
| 1698 | VI 27. 44. 151. 46. | 0 37. 00. 51. | 0 37. 0. 47. 20 | 0. 38. 10 A | 69129 | 9. 859660 | Oct. 8. 16 57 | |

Hæc Tabula vix indiget explicatione, cum ex titulis satis pateat quid sibi velint Numeri.
Diſtantiæ autem perihelii æſtimantur in ejuſmodi partibus quales media diſtantiæ Terræ à
Sole habet centies millenas.

(1887)

*Tabula Generalis pro Supputando Motu
Cometarum in Orbe Parabolico.*

| <i>Medius motus.</i> | <i>Angulus à perihelio.</i> | <i>Logarithmus pro distantia à Sole.</i> | <i>Medius motus.</i> | <i>Angulus à perihelio.</i> | <i>Logarithmus pro distantia à Sole.</i> |
|--------------------------|---------------------------------|--|--------------------------|---------------------------------|--|
| o | gr. ' " | | o | gr. ' " | |
| 1 | 1. 31. 40 | 0. 000077 | 31 | 42. 55. 07 | 0. 062400 |
| 2 | 3. 3. 15 | 0. 000309 | 32 | 44. 3. 16 | 0. 065835 |
| 3 | 4. 34. 43 | 0. 000694 | 33 | 45. 10. 26 | 0. 069316 |
| 4 | 6. 6. 0 | 0. 001231 | 34 | 46. 16. 35 | 0. 072839 |
| 5 | 7. 37. 1 | 0. 001921 | 35 | 47. 21. 36 | 0. 076396 |
| 6 | 9. 7. 44 | 0. 002759 | 36 | 48. 25. 33 | 0. 079984 |
| 7 | 10. 38. 2 | 0. 003745 | 37 | 49. 28. 29 | 0. 083604 |
| 8 | 12. 7. 53 | 0. 004876 | 38 | 50. 30. 23 | 0. 087249 |
| 9 | 13. 37. 17 | 0. 006151 | 39 | 51. 31. 11 | 0. 090912 |
| 10 | 15. 6. 6 | 0. 007564 | 40 | 52. 30. 54 | 0. 094594 |
| 11 | 16. 34. 20 | 0. 009115 | 41 | 53. 29. 42 | 0. 098298 |
| 12 | 18. 1. 54 | 0. 010798 | 42 | 54. 27. 32 | 0. 102019 |
| 13 | 19. 28. 47 | 0. 012609 | 43 | 55. 24. 22 | 0. 105752 |
| 14 | 20. 54. 53 | 0. 014550 | 44 | 56. 20. 11 | 0. 109490 |
| 15 | 22. 20. 14 | 0. 016607 | 45 | 57. 15. 5 | 0. 113240 |
| 16 | 23. 44. 43 | 0. 018783 | 46 | 58. 9. 2 | 0. 116995 |
| 17 | 25. 8. 22 | 0. 021072 | 47 | 59. 2. 5 | 0. 120756 |
| 18 | 26. 31. 7 | 0. 023470 | 48 | 59. 54. 13 | 0. 124518 |
| 19 | 27. 52. 55 | 0. 025969 | 49 | 60. 45. 26 | 0. 128278 |
| 20 | 29. 13. 52 | 0. 028551 | 50 | 61. 35. 45 | 0. 132035 |
| 21 | 30. 33. 39 | 0. 031263 | 51 | 62. 25. 14 | 0. 135792 |
| 22 | 31. 52. 31 | 0. 034045 | 52 | 63. 13. 50 | 0. 139541 |
| 23 | 33. 10. 23 | 0. 036916 | 53 | 64. 1. 38 | 0. 143288 |
| 24 | 34. 27. 12 | 0. 039864 | 54 | 64. 48. 38 | 0. 147029 |
| 25 | 35. 42. 59 | 0. 042892 | 55 | 65. 34. 50 | 0. 150762 |
| 26 | 36. 57. 41 | 0. 045989 | 56 | 66. 20. 14 | 0. 154482 |
| 27 | 38. 11. 20 | 0. 049154 | 57 | 67. 04. 51 | 0. 158192 |
| 28 | 39. 23. 56 | 0. 052383 | 58 | 67. 48. 22 | 0. 161890 |
| 29 | 40 35. 26 | 0. 055668 | 59 | 68. 31. 51 | 0. 165578 |
| 30 | 41. 45. 50 | 0. 059010 | 60 | 69. 14. 16 | 0. 169254 |

M m m m m m m m m m

(1888)

Tabula Generalis pro Supputando

| <i>Medius motus.</i> | <i>Angulus à perihelio.</i> | <i>Logarithmus pro distantia à Sole.</i> | <i>Medius motus.</i> | <i>Angulus à perihelio.</i> | <i>Logarithmus pro distantia à Sole.</i> |
|--------------------------|---------------------------------|--|--------------------------|---------------------------------|--|
| o | gr. " | | o | gr. " | |
| 61 | 69. 55. 58 | 0. 172914 | 91 | 86. 20. 34 | 0. 274176 |
| 62 | 70. 36. 56 | 0. 176557 | 92 | 86. 46. 20 | 0. 277239 |
| 63 | 71. 17. 16 | 0. 180188 | 93 | 87. 11. 43 | 0. 280284 |
| 64 | 71. 56. 56 | 0. 183803 | 94 | 87. 36. 45 | 0. 283306 |
| 65 | 72. 35. 57 | 0. 187404 | 95 | 88. 01. 27 | 0. 286308 |
| 66 | 73. 14. 15 | 0. 190978 | 96 | 88. 25. 49 | 0. 289293 |
| 67 | 73. 51. 59 | 0. 194540 | 97 | 88. 49. 48 | 0. 292252 |
| 68 | 74. 29. 6 | 0. 198085 | 98 | 89. 13. 32 | 0. 295201 |
| 69 | 75. 05. 38 | 0. 201614 | 99 | 89. 36. 54 | 0. 298122 |
| 70 | 75. 41. 35 | 0. 205122 | 100 | 90. 00. 00 | 0. 301030 |
| 71 | 76. 16. 56 | 0. 208612 | 102 | 90. 45. 14 | 0. 306782 |
| 72 | 76. 51. 43 | 0. 212080 | 104 | 91. 29. 18 | 0. 312469 |
| 73 | 77. 25. 57 | 0. 215529 | 106 | 92. 12. 14 | 0. 318060 |
| 74 | 77. 59. 41 | 0. 218963 | 108 | 92. 54. 4 | 0. 323587 |
| 75 | 78. 32. 54 | 0. 222378 | 110 | 93. 34. 52 | 0. 329042 |
| 76 | 79. 5. 35 | 0. 225769 | 112 | 94. 14. 40 | 0. 334424 |
| 77 | 79. 37. 45 | 0. 229142 | 114 | 94. 53. 30 | 0. 339736 |
| 78 | 80. 9. 23 | 0. 232488 | 116 | 95. 31. 22 | 0. 344979 |
| 79 | 80. 40. 34 | 0. 235809 | 118 | 96. 8. 22 | 0. 350153 |
| 80 | 81. 11. 16 | 0. 239127 | 120 | 96. 44. 30 | 0. 355262 |
| 81 | 81. 41. 31 | 0. 242416 | 122 | 97. 19. 48 | 0. 360306 |
| 82 | 82. 11. 19 | 0. 245684 | 124 | 97. 54. 17 | 0. 365284 |
| 83 | 82. 40. 40 | 0. 248933 | 126 | 98. 28. 00 | 0. 370200 |
| 84 | 83. 9. 34 | 0. 252159 | 128 | 99. 00. 57 | 0. 375052 |
| 85 | 83. 38. 4 | 0. 255366 | 130 | 99. 33. 11 | 0. 379842 |
| 86 | 84. 6. 8 | 0. 258552 | 132 | 100. 4. 43 | 0. 384576 |
| 87 | 84. 33. 49 | 0. 261720 | 134 | 100. 35. 45 | 0. 389252 |
| 88 | 85. 1. 5 | 0. 264865 | 136 | 101. 5. 48 | 0. 393868 |
| 89 | 85. 27. 58 | 0. 267989 | 138 | 101. 35. 22 | 0. 398428 |
| 90 | 85. 54. 27 | 0. 271092 | 140 | 102. 4. 19 | 0. 402930 |

(1889)

Motu Cometarum in Orbe Parabolico.

| <i>Medius motus.</i> | <i>Angulus à perihelio.</i> | <i>Logarithmus pro distantia à Sole.</i> | <i>Medius motus.</i> | <i>Angulus à perihelio.</i> | <i>Logarithmus pro distantia à Sole.</i> |
|--------------------------|---------------------------------|--|--------------------------|---------------------------------|--|
| o | gr. ' " | | o | gr. ' " | |
| 142 | 102.32.41 | 0.407380 | 204 | 113.37.25 | 0.523406 |
| 144 | 103.00.31 | 0.411784 | 208 | 114. 9.52 | 0.529705 |
| 146 | 103.27.47 | 0.416132 | 212 | 114.41.23 | 0.535886 |
| 148 | 103.54.31 | 0.420430 | 216 | 115.12.02 | 0.541958 |
| 150 | 104.20.43 | 0.424676 | 220 | 115.41.51 | 0.547922 |
| 152 | 104.46.22 | 0.428866 | 224 | 116.10.52 | 0.553782 |
| 154 | 105.11.33 | 0.433012 | 228 | 116.39. 7 | 0.559538 |
| 156 | 105.36.16 | 0.437110 | 232 | 117. 6.38 | 0.565199 |
| 158 | 106.00.32 | 0.441164 | 236 | 117.33.27 | 0.570762 |
| 160 | 106.24.23 | 0.445178 | 240 | 117.59.35 | 0.576233 |
| 162 | 106.47.47 | 0.449144 | 244 | 118.25. 5 | 0.581616 |
| 164 | 107.10.44 | 0.453060 | 248 | 118.49.57 | 0.586912 |
| 166 | 107.33.17 | 0.456936 | 252 | 119.14.14 | 0.592122 |
| 168 | 107.55.27 | 0.460772 | 256 | 119.37.56 | 0.597252 |
| 170 | 108.17.14 | 0.464208 | 260 | 120. 1. 6 | 0.602301 |
| 172 | 108.38.37 | 0.468318 | 264 | 120.23.44 | 0.607274 |
| 174 | 108.59.39 | 0.472030 | 268 | 120.45.52 | 0.612174 |
| 176 | 109.20.20 | 0.475705 | 272 | 121. 7.30 | 0.616998 |
| 178 | 109.40.45 | 0.479340 | 276 | 121.28.39 | 0.621750 |
| 180 | 110.00.40 | 0.482937 | 280 | 121.49.22 | 0.626438 |
| 182 | 110.20.20 | 0.486458 | 284 | 122. 9.38 | 0.631056 |
| 184 | 110.39.41 | 0.490022 | 288 | 122.29.28 | 0.635608 |
| 186 | 110.58.44 | 0.493512 | 292 | 122.48.54 | 0.640098 |
| 188 | 111.17.2 | 0.496965 | 296 | 123. 7.57 | 0.644525 |
| 190 | 111.35.55 | 0.500384 | 300 | 123.26.36 | 0.648893 |
| 192 | 111.54.05 | 0.503769 | 310 | 124.11.40 | 0.659559 |
| 194 | 112.11.58 | 0.507121 | 320 | 124.54.36 | 0.669880 |
| 196 | 112.29.34 | 0.510441 | 330 | 125.35.34 | 0.679876 |
| 198 | 112.46.55 | 0.513729 | 340 | 126.14.44 | 0.689568 |
| 200 | 113. 4.00 | 0.516984 | 350 | 126.52.12 | 0.698970 |

(1890)

*Tabula Generalis pro Supputando Motu
Cometarum in Orbe Parabolico.*

| <i>Medius motus.</i> | <i>Angulus à perihelio.</i> | <i>Logarithmus pro distantia à Sole.</i> | <i>Medius motus.</i> | <i>Angulus à perihelio.</i> | <i>Logarithmus pro distantia à Sole.</i> |
|--------------------------|---------------------------------|--|--------------------------|---------------------------------|--|
| o | gr. ' " | | o | gr. ' " | |
| 360 | 127.28. 6 | 0.708104 | 820 | 141.49.24 | 0.970836 |
| 370 | 128. 2.33 | 0.716976 | 840 | 142.10.00 | 0.978397 |
| 380 | 128.35.38 | 0.725606 | 860 | 142.29.56 | 0.985771 |
| 390 | 129. 7.27 | 0.734006 | 880 | 142.49.10 | 0.992970 |
| 400 | 129.38. 4 | 0.742186 | 900 | 143. 7.48 | 1.000000 |
| 410 | 130. 7.34 | 0.750160 | 920 | 143.25.51 | 1.006871 |
| 420 | 130.36. 2 | 0.757930 | 940 | 143.43.21 | 1.013586 |
| 430 | 131. 3.30 | 0.765516 | 960 | 144.00.18 | 1.020155 |
| 440 | 131.30. 2 | 0.772918 | 980 | 144.16.46 | 1.026583 |
| 450 | 131.55.41 | 0.780148 | 1000 | 144.32.46 | 1.032876 |
| 460 | 132.20.30 | 0.787216 | 1500 | 149.26. 8 | 1.158188 |
| 470 | 132.44.32 | 0.794122 | 2000 | 152.26.15 | 1.246058 |
| 480 | 133. 7.50 | 0.800882 | 2500 | 154.32.20 | 1.313703 |
| 490 | 133.30.25 | 0.807494 | 3000 | 156. 7.27 | 1.368678 |
| 500 | 133.52.20 | 0.813969 | 3500 | 157.22.49 | 1.414974 |
| 520 | 134.34.18 | 0.826522 | 4000 | 158.24.36 | 1.454950 |
| 540 | 135.14. 0 | 0.838600 | 4500 | 159.16.36 | 1.490125 |
| 560 | 135.51.28 | 0.850187 | 5000 | 160. 1.12 | 1.521521 |
| 580 | 136.27. 6 | 0.861369 | 5500 | 160.40. 5 | 1.549874 |
| 600 | 137.00.57 | 0.872155 | 6000 | 161.14.24 | 1.575718 |
| 620 | 137.33.13 | 0.882575 | 6500 | 161.45.00 | 1.599460 |
| 640 | 138. 3.58 | 0.892649 | 7000 | 162.12.34 | 1.621417 |
| 660 | 138.33.21 | 0.902401 | 7500 | 162.37.34 | 1.641838 |
| 680 | 139. 1.29 | 0.911866 | 8000 | 163.00.23 | 1.660922 |
| 700 | 139.28.25 | 0.921012 | 8500 | 163.21.20 | 1.67 834 |
| 720 | 139.54.16 | 0.929907 | 9000 | 163.40.42 | 1.695708 |
| 740 | 140.19. 5 | 0.938549 | 9500 | 163.58.38 | 1.711662 |
| 760 | 140.42.56 | 0.946951 | 10000 | 164.15.20 | 1.726784 |
| 780 | 141.05.55 | 0.955124 | 50000 | 170.52. 0 | 2.197960 |
| 800 | 141.28. 3 | 0.963082 | 100000 | 172.45.44 | 2.399655 |

Tabulæ

&c. habebuntur totidem z five ordinatim applicatæ CQ respective ; ac divisa erit area SOP in partes centenas. Eodemque modo ultra locum O continuandus est calculus. Radix autem hujus æquationis, cum RQ sit = 1, Tangens est Tabularis anguli CRQ, five dimidii anguli CSP, adeoque angulus CSP datur. Ejusdemque anguli CRQ secans RC, Media proportionalis est inter RQ five Unitatem & RT, quæ dupla est ipsius SC, ut ex Conicis notissimum est. Quod si SP ponatur 1, adeoque latus rectum = 4 (ut in Tabulâ nostrâ) ipsâ RT erit distantia quæsitâ ; duplum scilicet ipsius SC in priore Parabola. Ad hunc modum itaque præcedentem Tabulam elaboravi repræsentandis omnium Cometarum motibus inservientem : hætenus enim nullus ex observatis Parabolæ leges respuit.

Restat jam præcepta Calculi tradere, modumque supputandi locum Cometæ visum ex his Numeris exhibere. Cometæ autem in Parabola moventis Velocitas ubique est ad velocitatem Planetæ gyrantis in Circulo circa Solem, ad eandem à Sole distantiam, ut $\sqrt{2}$ ad 1 : ut constat ex *Principiis Phil. Nat. Math. Lib. I. Prop. 16. Corol. 7.* Si itaque Cometa in perihelio ad distantiam æqualem distantiae Terræ à Sole supponatur, erit area diurna, quam describeret Cometa, ad aream quam describit Terra, ut $\sqrt{2}$ ad 1. ac proinde tempus annum, ad tempus quo Cometa talis describeret Quadrantem Orbitæ suæ à Perihelio ut 3. 14^h 59 &c. (hoc est ut area circuli) ad $\sqrt{\frac{1}{2}}$. Cometa igitur describeret Quadrantem illum diebus 109. 14^h. 46'. adeoque areâ illâ Parabolicâ areæ POS analogâ in centum particulas distributâ, singulis diebus competunt particulae 0,912280. Cujus Logarithmus nempe 9,960128 in perpetuum usum servandus est. Tempora autem, quibus Cometa in distantia majore vel minore Quadrantes similes describeret, sunt ut Revolutiones in Circulis ; hoc est in sesquuplicata ratione distantiarum : adeoque areæ diurnæ in partibus centesimis Quadrantis æsti-

æstimatæ (quas medii Motus mensuras, instar Graduum, ponimus) sunt in singulis in subsesquialtera ratione distantia Periheliæ à Sole.

His necessario præmissis proponatur alicujus è Cometis nostris Locum visum ad datum tempus supputare. Primum itaque Solis Locus ab Æquinoctio in promptu sit, ejusdemque distantia à Terrâ Logarithmus. 2°. Capiatur intervallum Temporis inter Tempus Perihelii & Tempus datum, in diebus partibusque diei decimalibus. Hujus numeri Logarithmo addatur Logarithmus constans 9,960128 ac complementum Arithmeticum sesquialterius Logarithmi distantia Periheliæ à Sole: summa Logarithmus erit Motûs medii in prima Columna Tabulæ Generalis quærendi. 3°. Cum motu medio capiatur in Tabulâ correspondens angulus à Perihelio, & Logarithmus pro distantia à Sole: ac in Cometis Directis adde, in Retrogradis subduc, si fuerit Tempus post Perihelium; vel in Directis subduc & in Retrogradis adde, si fuerit ante Perihelium, angulum sic inventum à loco vel ad locum Perihelii. Et habebitur Locus Cometæ in orbitâ propriâ: Et ad Logarithmum pro Distantiâ ibidem inventum addatur logarithmus distantia Periheliæ, summa erit Logarithmus distantia veræ Cometæ à Sole. 4°. Cum Loco Cometæ in Orbitâ, dato Loco Nodi, capiatur distantia Cometæ à Nodo: ac datâ Inclinatione plani, dabuntur, Notissimis Trigonometriæ præceptis, Locus Cometæ ad Eclipticam reductus, cum Inclinatione sive Latitudine Heliocentricâ, ac Distantia Curtatæ Logarithmus. 5°. Ex his datis, iisdem omnino regulis quibus loca Planetarum, ex dato Loco & Distantia Solis; obtinebitur Locus Visus seu Geocentricus cum Latitudine visa. Id quod exemplo uno vel altero operæ pretium erit illustrare.

(1894)

Exemp. I. Quæritur Locus Cometæ Anni 1664 Martii 1^o. 7^h. 00'.
P. M. Londini. Hoc est 96^d. 19^h. 8'. post Perihelion
ejus Novemb. 24^o. 11^h. 52'. Celebratum.

| | | | | | |
|---------------------|-----------|-------------------|------------------------|---------------------|-----------------|
| Log. dist. Perihel. | 0. 011044 | Perihel. Ω | 10. 41. 25 | Log. pro dist. | 0. 255369 |
| Log. Sesquialt. | 0. 016566 | Ang. Corresp. | 83. 38. 05--- | Log. Perihel. | 0. 011044 |
| Comp. Arith. | 9. 983434 | Comet. in Orb. | γ 17. 3. 20 | Co. sin. Incl. | 9. 990754 |
| | 9. 960128 | | δ II 21. 14. 00 | Log. dist. Curt. | 0. 257167 |
| Log. Temp. | 1. 985862 | Com. à Nodu | 34. 10. 40 | Log. dist. \odot | 9. 997918 |
| Log. Med. Mot. | 1. 929424 | Red. ad Eclip. | 32. 19. 05 | \odot \times | 21. 44. 45 |
| Medius Motus | 85. 001 | Com. Helioc. | γ 18. 54. 55 | Com. Visus γ | 29. 18. 30. |
| | | Incl. Bor. | 11. 46. 50. | Lat. Visus | 8. 36. 15. Bor. |

Exemp. II. Quæritur Locus Cometæ Anni 1683 Julii 23^o. 13^h. 35'.
P. M. Londini. Vel 13^h. 40'. T. æquat. hoc est
21^d. 10^h. 50'. post Perihelion.

| | | | | | |
|---------------------|-----------|-----------------|------------------------------|------------------------|------------|
| Log. dist. Perihel. | 9. 748343 | Perihel. II | 25. 29. 30 | Log. pro dist. | 0. 111336 |
| Log. Sesquialt. | 9. 622514 | Ang. Corresp. | 56. 47. 20 | Log. Perihel. | 9. 748343 |
| Comp. Arith. | 0. 377486 | Comet. in Orb. | γ 28. 42. 10 | Co. sin. Incl. | 9. 913187 |
| | 9. 960128 | | γ \times 23. 23. 00 | Log. dist. Curt. | 9. 772866 |
| Log. Temp. | 1. 310723 | Com. à γ | 35. 19. 10 | Log. dist. \odot | 0. 006104 |
| Log. Med. Mot. | 1. 648337 | Red. ad Eclip. | 4. 48. 30 | \odot Locus Ω | 10. 41. 25 |
| Medius Motus. | 44. 498 | Com. Helioc. | \times 28. 11. 30 | Com. Visus Ω | 5. 11. 50 |
| | | Incl. Bor. | 35. 2. 00 | Lat. Bor. | 28. 52. 00 |

Momento autem primi Exempli, *Londini* observatum est Cometam applicari ad Stellam secundam *Arietis*; ita ut novem minutis illâ borealior repertus sit, ac tribus minutis orientior: Observante D^{no} *Roberto Hookio*. In secundo autem Exemplo ipse, in viciniâ *Londini*, instrumentis quibus olim *Stellas Australes* observaveram, Cometæ locum deprehendi \approx . 5°. 11'. $\frac{1}{2}$, cum Latitudine Boreali, 28'. 52', consentiente ad amussim observatione *Grenovicensî* eodem pene momento factâ.

Cometa autem Anni 1680, qui pene Solem attigit, (non enim triente semidiametri corporis Solaris à superficie ejus distabat in Perihelio) cum *Latus rectum* exiguum admodum sit, *Tabulâ Generali* haud coerceri potuit, ob immensum

(1895)

nem Motus medii velocitatem: præstat itaque in hoc, postquam inventus fuerit Motus medius, ex eodem, ope præcedentis æquationis $z z z + 3 z = \frac{1}{100} \text{ Mot. med.}$ Tangentem dimidii anguli à Perihelio elicere, una cum Logarithmo pro distantia à Sole. Quibus datis iisdem omnino regulis ac in cæteris procedendum est.

Ad hunc itaque modum Astronomico Lectori examinare licet numeros à me positos, quos summâ curâ ex observationibus quæ suppetebant exantlavi ; neque enim, antequam probe ad incudem redacti fuerint, ac multorum annorum studio quantum fieri possit politi, in publicum prodeunt. Hoc autem Specimen Astronomiæ Cometicæ, futuri operis Prodromum, editum esse volui ; ne forte superveniente fato perirent lucubrationes nostræ, ob Calculi difficultatem non cuivis homini denuo suscipiendæ. Monendus autem est Lector, quinque priores ordine Cometas, quorum tertius & quartus est à *Petro Apiano* observatus, quintus vero à *Paulo Fabricio*, uti & decimus à *Mæstlino* (ni fallor) anno 1596 conspectus, non eundem certitudinis gradum cum reliquis præ se ferre. Neque enim debitis organis nec curâ ad hoc requisitâ observationes ipsæ peractæ sunt ; adeoque inter se dissidentes nullo modo cum computo regulari conciliari possunt. Cometam Anni 1684 unus vidit *Bianchini* observator *Romanus* : ultimum vero Anni sc. 1698 *Parisenses* soli conspexerunt, ejusque cursum insolito modo designarunt. Obscurus hic admodum, etiamsi velox ac terris satis vicinus, nostros sane oculos alioquin non incuriosos effugit. Insignes autem duos hac nostra ætate Cometas, alterum Anno 1689 Mense *Novembri* ortum, alterum Mense *Februario* Anni 1702, Catalogo subjungere non licuit, propter defectum observationum. Etenim versus mundi plagas Australes cursum dirigentes, ac in *Europâ* vix conspicui, contemplatores non habuere negotio pares. Quod si forsan ex partibus *Indiciis* advectæ fuerint accuratæ observationum series ad hoc necessariae ; lubens calculum

repetere, horumque Orbitas, reliquorum ad modum, Numeris designandi laborem suscipere non gravabor.

Angustia autem paginae 1886, factum est, ut omissa sit necessaria illa Columella quæ ostendat an directe vel retrograde moti fuerint Cometae. Sciat itaq; Astronomus undecim e nostris Cometis directo cursu secundum seriem signorum processisse, nempe illos annorum 1532, 1556, 1580, 1585, 1618, 1652, 1661, 1672, 1680, 1684 & 1686. Reliquos vero tredecim motu retrogrado contra seriem signorum cursum tenuisse. Quibus perpenſis, ac collatis inter se cæteris horum Cometarum motuum Elementis, videre est, nullo ordine dispositos esse Orbitas; neque ipsos, Planetarum more, Zodiaco comprehendi posse, quaquaversum tam Retrograde quam directe indifferenter latus; unde manifestum est eos motu vorticali nullo modo circumagi. Quinetiam distantiae Periheliae nunc majores nunc minores reperiuntur; unde proum est suspicari etiam multo plures esse Cometas, qui in partibus à Sole remotioribus, obscuri caudaque destituti, adeoque nobis inconspicui, præterlabi possunt.

Hactenus Cometarum Orbes considerauimus ut perfectè Parabolicos; quo supposito consequeretur Cometas, vi Centripeta versus Solem impulsos, à spatiis infinite distantibus descendere, casuque suo velocitatem tantam acquirere, ut iterum in spatia Mundi remouissinia sese abdere possint, perpetuo nisu sursum tendentes, ac ad Solem nunquam reuersuri. Cum autem satis frequentes sint Cometarum aduentus; ac eorum nullus reperiatur motu ferri Hyperbolico, seu velociore quam cadendo ad Solem acquirere debeat, credibile est potius in Orbibus valde Excentricis revolui eos circa Solem, ac post longissimas periodos reuerti. Sic enim Numerus eorum præfinitus esset, ac fortasse non usque adeo magnus. Spatia autem inter Solem fixasque tanta sunt, ut Cometae revoluenti cum Periodo quamcumvis longa satis loci sit. Latus autem rectum Ellipsis est ad Latus rectum Parabolæ eandem Periheliam distantiam habentis,

tis, ut distantia Aphelia in Elliptico est ad Axem totum Ellipsis, Velocitates autem sunt in dimidiata ratione eorundem : quapropter in Orbibus valde Excentricis ratio hæc accedit proxime ad rationem æqualitatis. Tantilla autem differentia, quæ intercedit ratione majoris in Parabola velocitatis, facillime in situ Orbis determinando compensatur. Hujus itaque Tabulæ Elementorum Motuum usus præcipuus est, atque etiam propter quem illam construere operæ pretium duxi, ut, si quando novus Cometa emerferit, possimus collatis elementis dignoscere an poterit esse aliquis ex antiquis, necne ; ac proinde Periodum Orbitæque Axem determinare, reditumque prædicere. Ac sane multa me suadent ut credam Cometam anni 1531 ab *Apiano* observatum, eundem fuisse cum illo qui anno 1607 descriptus est à *Keplero* & *Longomontano*, quemque ipse iterum reversionem vidi ac observavi anno 1682. Quadrant Elementa omnia, ac sola inæqualitas periodorum adversari videtur : hæc autem tanta non est ut causis Physicis non possit attribui. *Saturni* enim motus à cæteris, præsertim *Jove*, ita interturbatur, ut per aliquot dies integros incertum sit hujus Planetæ tempus Periodicum. Quanto magis talibus erroribus obnoxius erit Cometa, qui quatuor pene vicibus altius excurrit *Saturno*, cujusque velocitas, vel tantillum aucta, Orbem ab Elliptico in Parabolicum possit immutare ? Confirmatur etiam eundem esse potuisse ex eo, quod anni 1456 æstate, conspectus fuerit Cometa eodem pene modo inter Solem & Terram transiens retrogradè : quem, licet à nemine observatus fuerit Astronomicè, ex periodo modoque transitus non diversum a prædictis extitisse conjicio. Unde ausim ejusdem reditum fidenter prædicere, anno scilicet 1758. Quod si hoc evenerit, nulla amplius erit dubitandi causa, quin redire debeant cæteri. Habebunt ergo Astronomi in hac arenâ quo se exerceant per multa Secula, priusquam tot tantorumque Corporum circa commune centrum Solis revolvantium numerus cognoscatur, ac motuum symptomata certis regulis coerceantur. Crediderim equidem

Cometam

Cometam etiam anni 1532, eundem fuisse cum illo, qui ab *Hevelio* observabatur ineunte anno 1661 : sed observationes *Apiani*, quas solas de primo habemus, nimis rudes sunt, nec quicquam certi in re tam subtili ex iisdem elici potest. Iusto volumine hæc omnia exequi mihi animus est, nec Astronomiæ promovendæ hac in re deero, si Deo O.M. visum fuerit vitam facultatesque prorogare. Interim quicunque modum Construendi Cometarum Orbes per tres observationes accurate habitas addiscere cupit, sub finem libri de Systemate Mundi, sive tertii *Philosophiæ Nat. princip. Math.* magni ipsius Inventoris methodam inveniet : Quam postea Dignissimus Collega meus *D. Gregorius*, Lib. V. pereruditæ Astronomiæ suæ Physiçæ & Geometriçæ plene & luculenter illustravit.

Unicum autem non abs re erit nec injucundum, hic loci Lectorem monere Astronomum ; nempe quod nonnulli ex his Cometis Nodos suos habeant adeo Orbi Terræ annuo vicinos, ut si forte acciderit, tempore reditus Cometæ, *Terram* occupare Loca in orbe suo Nodo proxima, dum Cometa incredibili cum Velocitate præterierit, Parallaxin etiam habiturus sit valde observabilem, quæque fuerit ad Solis parallaxin in ratione datâ. Unde occasione talium transituum oblata erit ansa, rara quidem sed optima, determinandi Solis a *Terra* distantiam ; quam hætenus non nisi mediante parallaxi *Martis* Acronychii, vel *Veneris* perigææ, triplo quidem solari majore, sed quæ vix ullis instrumentis sentiat, laxè admodum concludere licuit. Quem Cometarum usum suggestit Clarissimus Geometra D^s *Nic. Facio*. Cometa etenim anni 1472 parallaxin habuit plûsqvam vigesies Solari majorem. Ac si Cometa anni 1618 appulisset, juxta medium Mensis *Martii*, ad Nodum ejus Descendentem ; vel si Cometa anni 1684 paulo citius ad Nodum Ascendentem pervenisset, profecto Terris admodum propinqui etiam adhuc magis notabiles habuissent parallaxes : Inter omnes vero nullus propiore appulsu Terris minatus est quam ille anni 1680 : Hic inito Calculo non amplius ad Boream distabat

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distabat ab Orbe nostro annuo, quam semidiametro solari (sive Radio Lunaris Orbitæ, uti existimo) idque Novemb. 11^o. 1^h. 6^t. P. M. Quo tempore, si Terræ quoad Longitudinem conjunctus fuisset, parallaxis sane Lunari æqualis in Cometæ motu observari potuisset. Hæc Astronomis dicta sunt. Quæ vero ab hujusmodi allapsu, vel contactu vel denique collisione Corporum cœlestium (quæ quidem omnino non impossibilis est) consequi debeant, rerum Physicarum studiosis discutiendæ relinquo:

V. *Part of two Letters from the Reverend Dr Rich. Wroe, Warden of Manchester Colledge, to Dr Hans Sloane, S. R. S. concerning Horn-like Excrescences growing on the Fingers, &c.*

Manchester, Aug. 26. 1704.

Sir,

T Here lives at *Bolton* (8 miles from this Town) one *Nathaniel Hulme*, aged about 17, who had the Small Pox about 8 years of age: Soon after which he had a great Itch, almost to the degree of a Leprosie, with which his Finger-nails and Thumb-nails began to grow thick, and by degrees hardned into Horns; which grew in 7 or 8 months to the length of an Inch, and some almost 2 Inches, and some much longer. It began in the Fore-finger of his Left Hand, and so to all the rest of that Hand, which had as many Horns as Fingers, and Thumb. All which Horns about the end of 12 months fell off by degrees; that which grew first falling off first, without any pain, unless when cut off, as they were at first, there